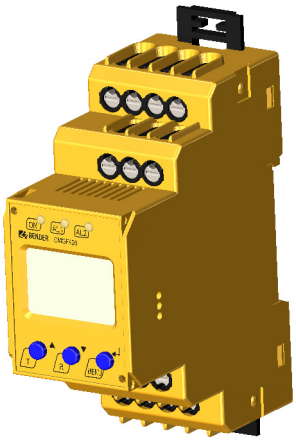
EN Manual

BENDER
The Power in Electrical Safety

CMGF420



Service entrance ground fault relay

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Bender Inc.

USA:
420 Eagleview Blvd.
Exton, PA 19341
Toll Free: 800-356-4266
Phone: 610-383-9200
Fax: 610-466-2071
E-mail: info@benderinc.com

Canada:
5810 Ambler Drive, Unit 1
Mississauga, ON L4W 4J5
Toll Free: 800-243-2438
Phone: 905-602-9990
Fax: 905-602-9960
E-mail: info@bender-ca.com

Web: www.benderinc.com

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1. Introduction

1. 1 CMGF420 ground fault relay

The CMGF420 is a control-powered, ground fault protection device used to protect an electrical distribution system from ground faults. The relay receives input from the connected current transformer, processes the information, and if necessary, changes the state of output contacts. The output contacts will cause a connected interruption device (such as a shunt trip breaker or fused switch) to trip and interrupt power.

The relay supports a pickup range of up to 1200 amperes when using a compatible current transformer. The CMGF420 supports current transformers with a 600:1 ratio (60 to 1200 A trip range) or 1000:1 ratio (100 - 1200 A trip range). Refer to ordering information for compatible devices.

When the ratio of the current transformer is entered into the settings of the CMGF420, the value shown on the device's LCD display will be the value read on the primary side of the current transformer. Factory default settings support a 600:1 ratio current transformer, with the option to switch to 1000:1 after a settings adjustment.

1. 2 Additional components required

The following additional components are required for proper operation:

- Compatible current transformer. One sensor is required per device.
- Associated interruption device.

The interruption device must meet the following requirements:

- A device with a coil designed for normally de-energized operation, such as a shunt trip breaker or fused switch.
- A coil which operates on 24, 120, or 240 VAC with a maximum current rating of 5 A.

2. Safety Instructions

2. 1 General Safety Warning

DANGER

Hazard of Electric Shock, Burn, or Explosion

Only qualified maintenance personnel should operate or service this equipment. These instructions should not be viewed as sufficient for those who are not otherwise qualified to operate or service this equipment. No responsibility is assumed by BENDER for any consequences arising from use of this document.

Turn OFF all sources of electric power before performing any inspections, tests, or service on this equipment. Assume all circuits are live until they have been properly de-energized, tested, grounded, and tagged. Failure to observe these precautions will result in equipment damage, severe personal injury, or death.

Proper operation of this equipment depends on proper installation. Refer to NFPA 70, NFPA 70E, CSA Z462, and other relevant standards and codes for installation standards. Neglecting fundamental installation techniques will result in equipment damage, severe personal injury, or death.

Do not make any modifications to the equipment. Failure to observe this precaution will result in equipment damage or personal injury.

Use only manufacturer's and manufacturer recommended accessories with this equipment. Failure to do so may damage the equipment beyond repair.

2. 2 Using This Manual

Read these instructions carefully and become familiar with the equipment before attempting to install, operate, or service it. Throughout this manual, special messages may appear to warn of potential safety hazards or to call attention to information which clarifies instructions or procedures. Observe all safety messages that appear throughout this manual to avoid possible injury or death. An explanation of these symbols is given below.

DANGER: *Indicates a hazardous situation which, if not avoided,* ***will*** *result in death or severe injury.*

WARNING: *Indicates a potentially hazardous situation which, if not avoided, may result in death or injury.*

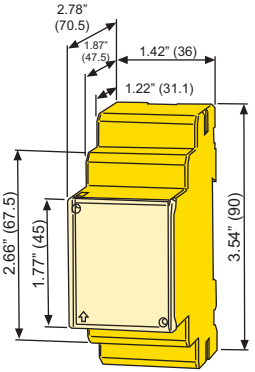
CAUTION: *Indicates a potentially hazardous situation which, if not avoided, may result in injury or equipment damage.*

NOTE: *Provides additional information to clarify instructions for a product or procedure.*

3. Installation and Connection

3. 1 Dimensions

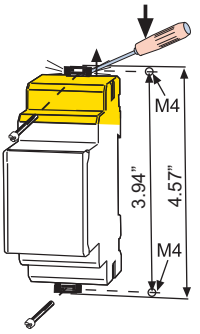
Dimensions given in inches (mm).



3. 2 Mounting

3.2.1 DIN Rail Mounting

1 Install 35 mm DIN rail for relay mounting.
2 Using a flathead screwdriver, pull the bottom mounting clip away from the relay until it clicks, and to provide sufficient clearance for mounting onto rail.
3 Slide the relay onto top side of rail, then rotate slowly downward to snap onto bottom side of rail.
4 Push the bottom mounting clip back in until relay is locked into position.

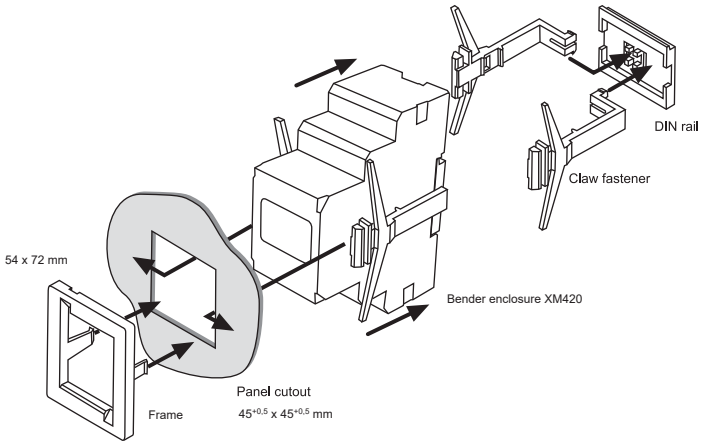


3.2.2 Panel Front Mounting

Panel front mounting the CMGF420 requires the additional panel mounting kit. Refer to ordering information on page 34.

The display and buttons will be accessible without opening the panel. Refer to figure below. Do not install the included DIN rail into the panel. The included rail is used to fasten the device to the panel front.

NOTE: *All wiring must be completed before panel mounting the device, otherwise wiring terminals will become inaccessible.*



1 Create a panel cutout measuring 45 x 45 mm.
2 Attach claw fasteners to included DIN rail as shown.
3 Using a flathead screwdriver, pull the bottom mounting clip away from the relay until it clicks, and provides sufficient clearance for mounting onto DIN rail.
4 Slide the relay onto top side of rail, then rotate slowly downward to snap onto bottom side of rail.
5 Push the bottom mounting clip back in until the relay is locked into position.
6 Slide relay front through the panel cutout. Attach claw fasteners to sides of cutout until relay is securely attached.

3. 3 Quick Setup Instructions for Typical Applications

WARNING: *Read and understand all instructions in this manual before proceeding. These quick setup instructions only apply to applications which meet the requirements listed below. Failure to observe this warning will result in damaged equipment and severe injury.*

These instructions only apply if the application meets the following requirements:

- Using a 600:1 ratio current transformer
- Using the correct interruption device

The coil for the connected interruption device must meet the following requirements:

- Operates normally de-energized (the coil of the interruption device only energizes when it goes into alarm)
- Operates normally open (the coil is open when the circuit is in the normal state, and the coil closes when it enters the alarm state and interrupts the circuit)
- Operates on 24, 120, or 240 VAC with a maximum current rating of 5 A

Typical equipment that meets these requirements include N/O shunt trip breakers and fused switches.

If the system does not meet these requirements, refer to full instructions in Section 3.4 onward, or contact Bender technical support for more information.

If the system meets these requirements, follow these quick setup instructions:

1 Read and understand all instructions in this manual before proceeding.
2 Wire the device according to Section 3. 4 (Page 11).
3 Wire the contact output to the interruption device according to the wiring diagram in Section 3.4.2 (Page 14).
4 Set the desired pickup level using the steps in Section 4.3.3 (Page 18).

3. 4 Wiring

Refer to figure on the following page for wiring diagram. Note the following instructions before wiring device:

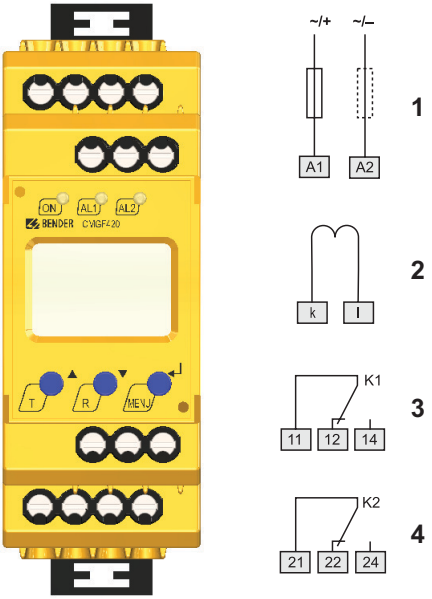
- Use minimum 24, maximum 14 AWG size wire.
- Use copper wiring only.
- Appropriate wiring stripping length is 0.3" (8 mm).
- Torque wire binding screws to 4 - 5 lb-in (0.5 - 0.6 N-m).
- A compatible current transformer is required for proper operation.
- All system conductors, including the neutral if one is used, must be placed centrally through the current transformer. Refer to page 13 for additional information on routing conductors.
- Refer to page 15 for detailed information regarding output contact wiring.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

This equipment must only be installed and serviced by qualified electrical personnel.
Disconnect all power before servicing.
Observe all local, state, and national codes, standards and regulations when installing this equipment.

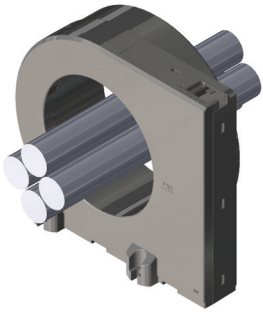
Failure to follow these instructions will result in death or severe injury.

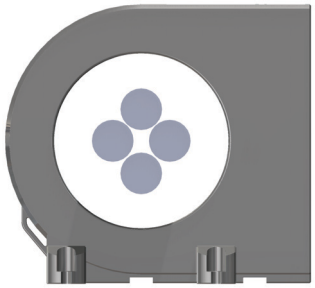


Connections	Description
1 - (A1, A2)	Connection to external supply voltage (100-240 VAC, 60 Hz). Fuse required (Recommended - 0.5 A MDL time delay fuse).
2 - (k, l)	Connection to external current transformer. All system conductors, including the neutral if it is used, are routed centrally through the opening. Refer to Section 3.4.1 (Page 13) for additional information on routing conductors.
3 - (11, 12, 14)	Relay K1, Form C contact - output contact for pre-alarm. Contact changes state when the pre-warning alarm is activated. Refer to Section 3.4.2 (Page 14) for wiring instructions.
4 - (21, 22, 24)	Relay K2, Form C contact - output contact for main pickup alarm. Contact changes state when the main alarm is activated. Refer to Section 3.4.2 (Page 14) for wiring instructions.

3.4.1 Wiring - Current Transformer Routing

All system conductors, including the neutral, must be routed through the current transformer. Ensure that the conductors are placed centrally through the opening. Direction is unimportant. Refer to figures below.





3.4.2 Wiring - Output Contacts

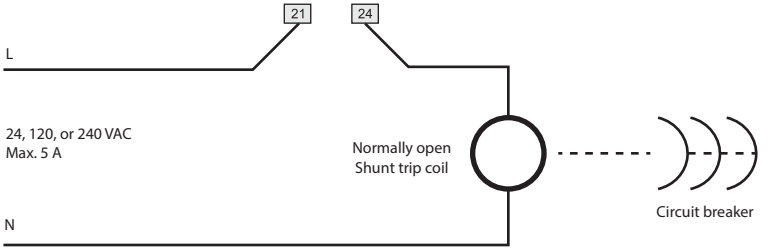
The CMGF420 has two form C contact outputs. Relay 1 (marked K1, terminals 11/12/14) switches on activation of the pre-alarm, and relay 2 (marked K2, terminals 21/22/24) switches on activation of the main pickup alarm.

Relay 2 operates in the following manner:

- During the normal condition, the contact is not energized. Terminals 21/22 are closed, and terminals 21/24 are open.
- When the CMGF420 enters the alarm condition, the contact will become energized. Terminals 21/22 will open, and terminals 21/24 will close.

Wire the output contact according to the wiring diagram below. The coil must be rated to connect to the contact outputs:

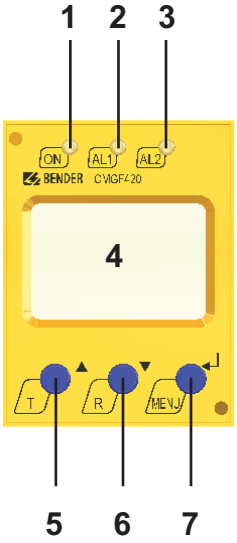
- 24, 120, or 240 VAC
- Maximum 5 A



NOTE: *Normally energized interruption equipment, such as contactors, should not be used with this device. Contact Bender for more information.*

4. Operation and Settings

4. 1 Front Panel Display



1	LED "ON" (green): Illuminates when power is applied to the device.
2	LED "AL1" (yellow): Illuminates when the pre-alarm is activated.
3	LED "AL2" (yellow): Illuminates when the main pickup alarm is activated.
4	LCD display Shows ground fault current readings and menu options.
5	TEST / UP button: Activates self-test / scrolls up inside device main menu.
6	RESET / DOWN button: Resets device in alarm after fault is cleared / scrolls down inside device main menu.
7	MENU / ENTER button: Activates main menu / confirms or cancels step inside main menu.

4. 2 Default Settings

Refer to table below for default values that are adjustable during device setup.

Current transformer turns ratio	600 (for 600:1 current transformer ratio)
Main pickup alarm	60 A (using 600:1 current transformer)
Pre-alarm	50% of main pickup alarm (30 A)

4. 3 Settings Adjustments

The instructions in this section show how to adjust settings. Follow the appropriate diagram for any desired settings changes.

4.3.1 Menu Legend

	DOWN ARROW / RESET button
	UP ARROW / TEST button
	MENU / ENTER button
Short press	Push button quickly
Hold > 1.5 s	Hold button for at least 1.5 seconds, then release.
Circled items	Items on the display which are circled indicate that the item is flashing intermittently during that step.

4.3.2 Change Current Transformer Ratio

CAUTION

CAUTION: *Only change this setting if using a CT with a ratio other than the factory default of 600:1. Failure to use the correct ratio will cause improper readings and damage the device and other equipment.*

The CMGF420 supports the following current transformer types:

- 1 A secondary - 600:1 or 1000:1 ratio
- 5 A secondary - 3000:5 or 5000:5 ratio

When entering the ratio, enter in the net value of the ratio, dividing out the secondary ratio.

Enter the value as shown below based on the current transformer's ratio:

- For a 600:1 ratio CT, use the factory default of "600."
- For a 3000:5 ratio CT, use the factory default of "600."
- For a 1000:1 ratio CT, enter in a value of "1000."
- For a 5000:5 ratio CT, enter in a value of "1000."

Instructions begin on this page and continue on the following page.

	Hold the MENU button for > 1.5 s. A flashing "AL" will appear on the screen.
	Press the DOWN button three times. A flashing "SET" will appear on the screen.
	Press the MENU button. The word "HI" will appear in the middle of the screen.
	Press the DOWN button once. A flashing "n" will appear in the top right corner, and "0.60k" will appear in the middle of the screen. This indicates that a transformer ratio of 600:1 is currently set.
	Press the MENU button. The "n" will become solid, and the number in the middle will flash.

	Press the DOWN button once to change the CT ratio to 1000.
 Short press	Press the MENU button. The number will become solid, and the "n" will flash. This indicates that the transformation ratio has successfully changed to 1000.
 Hold > 1.5 sec	Hold the MENU button for > 1.5 s. A flashing "SET" will appear on the screen.
 Hold > 1.5 sec	Hold the MENU button again for > 1.5 s. The device will exit the menu and return to the normal display.

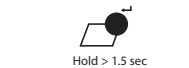
4.3.3 Change Main Pickup Value (AL2)

The increment of adjustment for the main pickup value varies based on the current transformer utilized. Refer to table below for increment examples.

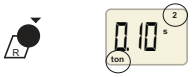
CT net ratio	Pickup range	Adjustment increment
600 (600:1 or 3000:5)	60 - 600 A	6 A
	600 - 1200 A	60 A
1000 (1000:1 or 5000:5)	100 - 1000 A	10 A
	1000 - 1200 A	100 A

NOTE: *If using a current transformer with a ratio other than the 600:1 default, change the ratio BEFORE changing the main pickup level. Changing the ratio afterwards will require re-entry of the pickup level.*

Instructions begin on the following page.

	Hold the MENU button for > 1.5 s. A flashing "AL" will appear on the screen.
	Press the MENU button. A number will appear in the middle of the screen. "I 2" will appear flashing in the top right corner, and a greater than symbol (>) will appear flashing on the left side.
	Press the MENU button. The "I 2" and greater than symbol will become solid, and the number in the middle will flash.
	Press the UP and DOWN buttons to change the pickup level to the desired amount. At a certain threshold, the value may change to a decimal value with a "k" to the right. This indicates that the place of the value has changed and is measured multiplied by 1000 (in the example shown, 0.80k is equal to 800 A).
	Once completed, press the MENU button to confirm the value. The number will become solid, and "I 2" and the greater than symbol (>) will flash.
	Hold the MENU button for > 1.5 s. A flashing "AL" will appear on the screen.
	Hold the MENU button again for > 1.5 s. The device will exit the menu and return to the normal display.

4.3.4 Change Main Response Delay (ton2)

	Hold the MENU button for > 1.5 s. A flashing "AL" will appear on the screen.
	Press the DOWN button twice. A flashing "t" will appear on the screen.
	Press the MENU button. A number will appear in the middle. A flashing "ton" will appear in the lower left corner, and a flashing "1" will appear in the top right corner.
	Press the DOWN button once. The number "1" in the top right corner will change to "2." This is the time delay for the main pickup alarm.
	Press the MENU button. The "2" and "ton" will become solid, and the number in the middle will flash.
	Press the UP and DOWN buttons to adjust the time delay to the desired value.
	Once complete, press the MENU button. The middle number will become solid, and the "ton" and "2" will flash.
	Hold the MENU button for > 1.5 s. A flashing "t" will appear on the screen.
	Hold the MENU button again for > 1.5 s. The device will exit the menu and return to the normal display.

4.3.5 Activate Password Protection

	Hold the MENU button for > 1.5 s. A flashing "AL" will appear on the screen.
	Press the DOWN button three times. A flashing "SET" will appear on the screen.
	Press the MENU button. The word "HI" will appear in the middle of the screen.
	Press the DOWN button twice. A flashing lock icon will appear in the lower right corner, and the word "OFF" will appear in the middle.
	Press the MENU button. The lock symbol will become solid, and the word "off" will appear flashing at the bottom of the screen.
	Press the DOWN button once. A flashing "on" will appear in the bottom left corner, and a number will appear in the middle..
	Press the MENU button. The "on" will become solid, and the number in the middle will flash.
	Press the UP and DOWN buttons to change the value to the desired password (example shown: 470).
	Once completed, press the MENU button. The number will change to the word "on," and the lock symbol in the lower right corner will flash.
	Hold the MENU button for > 1.5 s. A flashing "SET" will appear on the screen.
	Hold the MENU button again for > 1.5 s. The device will exit the menu and return to the normal display.

4.3.6 Change Password

Instructions begin on this page and continue on the following page.

Hold > 1.5 sec 	Hold the MENU button for > 1.5 s. A flashing "AL" will appear on the screen.
x 3 	Press the DOWN button three times. A flashing "SET" will appear on the screen.
Short press 	Press the MENU button. The word "HI" will appear in the middle of the screen.
x 2 	Press the DOWN button twice. A flashing lock icon will appear in the lower right corner, and the word "on" will appear in the middle.
Short press 	Press the MENU button. The lock icon will become solid. Three dashes will flash in the middle of the screen..
Password Entry 	Press the UP and DOWN buttons to enter in the password originally stored in the device (example shown: 470).
Short press 	Press the MENU button. The number will become solid, and "on" at the bottom will appear and flash.
Short press 	Press the MENU button. The "on" will no longer appear, and the number will flash.
Password Adjustment 	Press the UP and DOWN buttons to enter in the new password (example shown: 282).
Short press 	Once completed, press the MENU button. The word "ON" will appear in the middle to indicate the new password has been set. The lock symbol will flash.

	Hold the MENU button for > 1.5 s. A flashing “SET” will appear on the screen.
	Hold the MENU button again for > 1.5 s. The device will exit the menu and return to the normal display.

4.3.7 Remove Password Protection

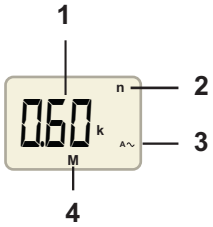
Instructions begin on this page and continue on the following page.

	Hold the MENU button for > 1.5 s. A flashing “AL” will appear on the screen.
	Press the DOWN button three times. A flashing “SET” will appear on the screen.
	Press the MENU button. The word “HI” will appear in the middle of the screen.
	Press the DOWN button twice. A flashing lock icon will appear in the lower right corner, and the word “on” will appear in the middle.
	Press the MENU button. The lock icon will become solid. Three dashes will flash in the middle of the screen..
	Press the UP and DOWN buttons to enter in the password originally stored in the device (example shown: 470).
	Press the MENU button. The number will become solid, and “on” at the bottom will appear and flash.
	Press the DOWN button once. The word “OFF” will appear in the middle, and “off” will appear flashing in the bottom left corner.

	Press the MENU button. The “off” in the lower left corner will no longer appear, and the lock symbol will flash. This indicates that password protection has been removed.
	Hold the MENU button for > 1.5 s. A flashing “SET” will appear on the screen.
	Hold the MENU button again for > 1.5 s. The device will exit the menu and return to the normal display.

4. 4 Using the CMGF420

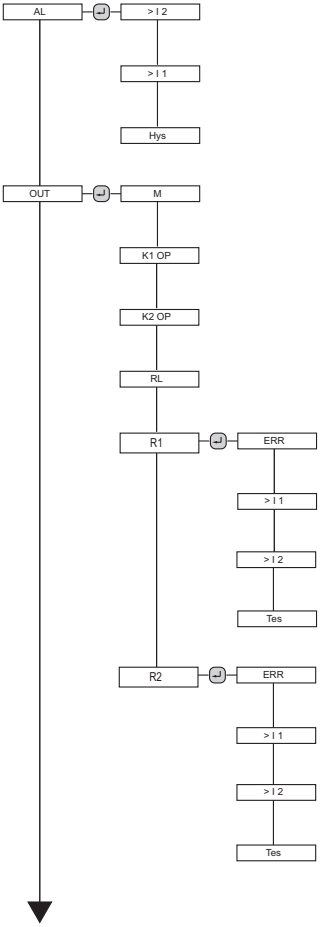
4.4.1 Read the Normal Display and Ground Fault Current



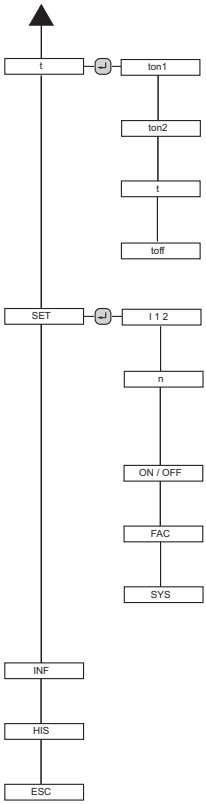
Display item	Description
1 - Measured ground fault current	Measured ground fault current. Values are displayed in real-time. Depending on the displayed value and the current transformer ratio utilized, values will either display in whole numbers, or a decimal with a "k" after it to indicate it is multiplied by 1000. Examples: 600 (value is 600 A) 0.60k (Value is 600 A) 1.00k (Value is 1000 A)
2 - n	Indicates that a current transformer ratio is entered.
3 - AC	Indicates that AC current is being monitored by the device.
4 - M	Indicates that latching operation is enabled.

4.4.2 Menu Structure / Settings Checklist

This section provides the menu structure of the CMGF420, along with a checklist of settings for the device. Use the "My Settings" box to record any changed settings. Any items that do not have a "My Settings" box are not adjustable. The menu structure begins on this page and continues into the next page.



Description	Range	Factory Default	My Settings
Trip level	60 - 1200 A	60 A	
Prewarning	50 - 100% as a percentage of the main pickup value	50%	
Hysteresis	1 - 40%	15%	
Latching behavior (Fault memory)	ON (latching) / OFF (non-latching) / CON (remains latched on power restore)	ON (latching)	
Relay K1 operation	N/O (normally de-energized)	N/O (normally de-energized)	
Relay K2 operation	N/O (normally de-energized)	N/O (normally de-energized)	
Reload Cycles	0 - 100	0	
Relay K1 trips on device error	ON	ON	
Relay K1 trips on prewarning	ON	ON	
Relay K1 trips on main pickup alarm	OFF	OFF	
Relay K1 trips on device self-test	ON	ON	
Relay K2 trips on device error	ON	ON	
Relay K2 trips on prewarning	OFF	OFF	
Relay K2 trips on main pickup alarm	ON	ON	
Relay K2 trips on device self-test	ON	ON	



Description	Range	Factory Default	My Settings
Response delay, prewarning	0 - 0.9 s	0.1 s	
Response delay, main pickup alarm	0 - 0.9 s	0.1 s	
Startup delay (applies only on device startup)	0.1 s	0.1 s	
Delay on release (to return to normal state)	0 - 300 s	1 s	
Device mode of operation	HI	HI	
Adjust transformer ratio (enter primary turns value, based on 1A secondary)	600 or 1000 examples: 600 = 600:1 or 3000:5 1000 = 1000:1 or 5000:5	600	
Password protection enable / disable	ON / OFF (0 - 999)	OFF	
Restore device to factory default settings			
For manufacturer use only			
Displays device firmware version			
Shows last tripped value			

4.4.3 Find the Recorded Value after Circuit Trip

NOTE: *Only the last trip value is stored. The value is stored in volatile memory. A power loss or power cycle to the CMGF420 will cause this value to be lost.*

If the device has tripped and entered the alarm state, follow the steps below to locate the alarm value that was measured:

	Hold the MENU button for > 1.5 s. A flashing "AL" will appear on the screen.
	Press the DOWN button five times. The word "HiS" will appear on the screen.
	Press the MENU button. If the device has tripped and has not had power cycled, a value will display in the middle of the screen. This number is the measured value that caused the CMGF420 to trip.

4.4.4 Reset the Device After Circuit Trip

If a ground fault has caused the CMGF420 and connected interruption device to trip, find the ground fault and clear it. Once the ground fault is cleared, hold the RESET button for at least 1.5 s. If the ground fault is cleared, the circuit will reset and enter the normal condition.

4.4.5 Run the Device Self-Test

WARNING: *Do not run the self-test while the system is live. Running the self-test will cause any connected interruption device to trip and power to the system will be lost. Failure to observe this warning may result in severe injury or damage to equipment.*

Follow these steps to run a self-test on the CMGF420.

- Hold the TEST button for at least 1.5 s.
- The word "tES" will flash on the screen for approximately 10 seconds while the self-test is running. The contacts will switch, and any connected interruption devices will trip.
- Once the self-test is completed the device will return to the normal display.
- Follow the steps in Section 4.4.4 (Page 28) to reset the device.

If an error code appears at any time during the self-test, contact Bender technical support.

4.4.6 Enter Password to Change Settings

If a password has been stored on the device, settings cannot be changed until the password is entered. Follow the instructions below to enable modifying settings. Note the following:

- Password protection is restored upon exiting the main menu. Reentering the main menu and attempting to change settings will require reentering the password.
- The password is stored in non-volatile memory and is retained on power loss.
- After 5 minutes of idle time in the menu, the device will automatically exit to the normal display. Re-entering the main menu and attempting to change settings will require reentering the password.

	When attempting to change and settings when password protection is enabled, three dashes will appear flashing on the screen, with a lock icon (solid) in the lower right corner.
	Press the UP and DOWN buttons to select the password stored in the device (example shown: 470).
	Press the MENU button. If the password is correct, the settings option originally selected will appear, with adjustments enabled. If an incorrect password is entered, the device will exit the main menu and return to the normal display.

5. Technical Data

( )* = Factory Setting

Insulation coordination acc. to IEC 60664-1

Rated insulation voltage ..... AC 250 V
Rated impulse voltage / pollution degree ..... 2.5 kV / III
Protective separation (reinforced insulation) between.....
..... (A1, A2) - (k, l) - (11, 12, 14) - (21, 22, 24)
Voltage test acc. to IEC 61010-1 ..... 2.1 kV

Supply voltage

Voltage rating ..... 100 - 240 VAC
Voltage tolerance ..... ± 20%
Frequency rating ..... 42 - 460 Hz
Power consumption ..... max. 3 VA

Direct connection current ratings

Rating ..... AC 0.05 - 15 A
Overload capability, continuous ..... 17.6 A
Overload capability, < 1 s ..... 40 A
Overload capability, instantaneous ..... 50 kA
Operating range of f_n ..... ±5%

Response values

Transformation ratio ..... 600, 1000 (600)*
Relative percentage error (50 / 60 Hz) ..... ± 3% / ± 2 digit
Hysteresis ..... 1 - 40% (15%)*
Ground fault response, n = 600
Setpoint range ..... 60 - 1200 A (60)*
Setpoint increment, 60 - 600 A ..... 6 A
Setpoint increment, 600 - 1200 A ..... 60 A
Ground fault response, n = 1000
Setpoint range ..... 100 - 1200 A
Setpoint increment, 100 - 1000 A ..... 10 A
Setpoint increment, 1000 - 1200 A ..... 100 A

Time delays

Startup delay t ..... 100 ms
Response delay t_{on1} ..... 100 - 900 ms (100 ms)*
Response delay t_{on2} ..... 100 - 900 ms (100 ms)*
Delay on release t_{off} ..... 0 - 300 s (1 s)*
Operating time t_{ae} ..... ≤ 70 ms
Response time t_{an} ..... $t_{ae} + t_{on1/2}$
Recovery time t_b ..... ≤ 300 ms

Displays, memory

Display range, measured value ..... AC 0.01 ... 6 A x n
Operating error (50 / 60 Hz) ..... ± 3% / ± 2 digit
Alarm value memory ..... Stores last recorded alarm (volatile memory)
Password ..... off / 0-999 (off)*
Alarm latching operation ..... on (latching) / off (auto-reset) (on)*

Switching elements

Quantity ..... 2 SPDT contacts
Operating principle ..... Normally de-energized operation
Electrical endurance ..... 10,000 cycles
Contact data acc. to IEC 60947-5-1:
Relay 1:

Utilization Category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	24 V	110 V	220 V
Rated operational current	5A	3A	1 A	0.2 A	0.1 A

Minimum contact rating ..... 1 mA at AC/DC ≥ 10 V
Relay 2:

Utilization Category	DC-12	DC-12	DC-12	DC-12
Rated operational voltage	250 V	24 V	110V	220 V
Rated operational current	2 A	1.2 A	0.4 A	0.25 A

Minimum contact rating ..... 1 mA at AC/DC ≥ 10 V

Environment / EMC

EMC ..... IEC 61326
Operating temperature ..... -13 °F to +131 °F (-25 °C to +55 °C)
Climatic class acc. to IEC 60721:
Stationary use (IEC 60721-3-3) ..... 3K5 (**)
Transport (IEC 60721-3-2) ..... 2K3 (**)
Long-term storage (IEC 60721-3-1) ..... 1K4 (**)
** = Except condensation and formation of ice
Classification of mechanical conditions acc. to IEC 60721:
Stationary use (IEC 60721-3-3) 3M4
Transport (IEC 60721-3-2) 2M2
Long-term storage (IEC 60721-3-1) 1M3

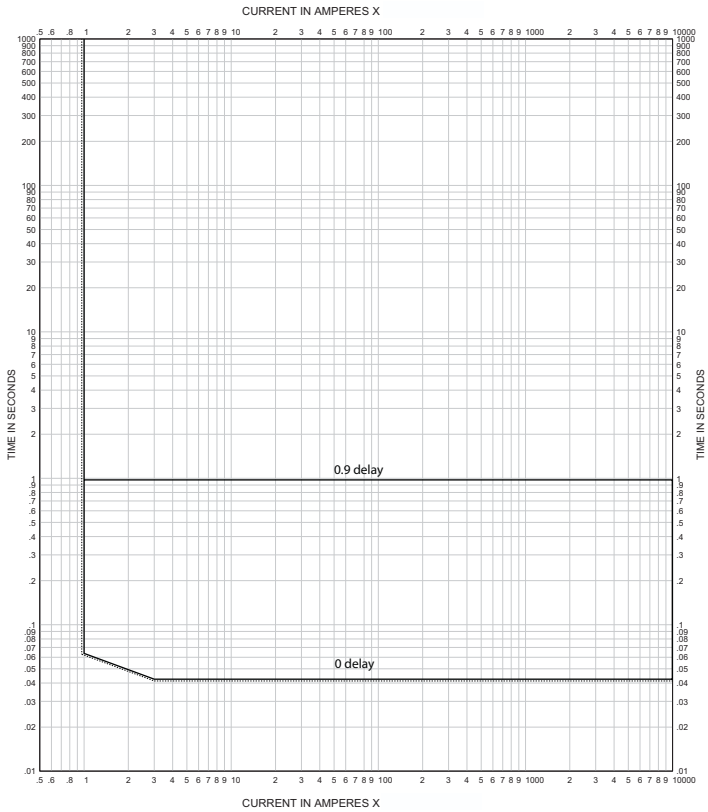
Connection

Connection type ..... Screw terminals
Wiring ratings, rigid ..... AWG 24-14 (0.2 - 2.5 mm^2)
Wiring ratings, flexible w/o ferrules ..... AWG 24-14 (0.2 - 2.5 mm^2)
Wiring ratings, flexible with ferrules ..... AWG 24-16 (0.2 - 1.5 mm^2)
Stripping length ..... 0.3" (8 mm)
Tightening torque ..... 4-5 lb-in (0.6-0.6 N-m)
Test opening, diameter ..... 0.1" (2.1 mm)

General data

Operating mode ..... Continuous
Mounting position ..... Display-oriented
Degree of protection, internal components ..... NEMA 1 (IP 30)
Degree of protection, terminals ..... NEMA 1 (IP 20)
Enclosure material ..... Polycarbonate
Flammability class UL94 V-0
DIN rail mounting ..... According to IEC 60715
Screw mounting ..... Qty. 2 M4 screws with mounting clips
Tightening Torque ..... 2.6 - 3.5 lb-in (0.3 - 0.4 N-m)
Weight ..... ≤ 160 g
Product standards .....
..... UL 508, UL 1053, CSA C22.2 No. 144, IEC 61010-1

5. 1 Trip Time Curve



5. 2 Ordering Information

Type	Description	Ordering No.
CMGF420-D-2	Ground fault relay	B 9306 0015
420 series mounting kit	Front panel mounting kit	B 5413 00486

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Bender Inc.
420 Eagleview Blvd. Exton, PA 19341
Toll Free: 800-356-4266
Phone: 610-383-9200
Fax: 610-466-2071
E-mail: info@benderinc.com

www.benderinc.com

Bender Canada:
5810 Ambler Drive, Unit 1
Mississauga, ON L4W 4J5
Toll Free: 800-243-2438
Phone: 905-602-9990
Fax: 905-602-9960
E-mail: info@bender-ca.com

www.bender-ca.com